

AIRCRAFT CONTROL HANDLES

pp. 20, 21

Note triggers and potentiometers in handle



missile

aircraft

military

GUARDIAN[®]
CONTROLS

EVERYTHING UNDER CONTROL



GUARDIAN

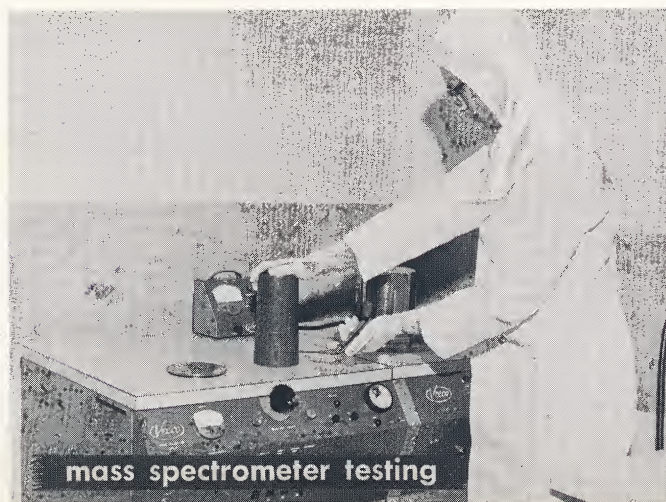
HIGHEST EFFICIENCY HERMETIC SEALING MEETS AND SURPASSES

AN - MS - MIL - JAN - and all critical specifications . . .

◆ Since 1932—the original concept of concentrating maximum power in minimum space plus original techniques developed by Guardian research engineers for hermetically sealing electromagnetic controls, have broadened the applicability of Guardian units sealed to Government specifications. Methods used to produce the most highly reliable hermetically sealed relays are described on these pages.



Above dry circuit oven bakes relays in both energized and de-energized positions and simultaneously evacuates enclosure. Lower view shows Guardian specialist using Veeco Mass Spectrometer to test for possible leakage.



Ultrasonic cleaning is done under controlled conditions in Guardian's "Clean Rooms". Tank at left utilizes detergent, isopropyl alcohol, trichlorethylene and distilled water. Dry nitrogen is blown on components to remove moisture.



Pre-heating oven is at left with fluxless soldering unit to the right. Guardian "FLUXLESS SOLDER SEALING" eliminates possibilities of internal contamination.



GUARDIAN . . . pioneers of special sealing techniques

◆ Guardian Electric control engineers have earned their reputation of high accomplishment in the art of designing and hermetically sealing small relays and controls. One of their original concepts which concentrated maximum power in minimum space is portrayed today by miniature, sub-miniature and micro-miniature units. Guardian ideas and original techniques such as *miniaturization* and *fluxless soldering* of hermetically sealed controls under ideal environmental conditions have helped shape the more efficient design of aircraft, military and astronautical equipment. A large number of Guardian hermetically sealed relays meet and surpass AN, MIL and other government specifications. They offer the final answer to the specific needs of the new jet age of supersonic flying, missile systems and space probing.

• • • standards of CONTROLLED ATMOSPHERE defy comparison

At Guardian Electric specially constructed "Clean Rooms" insure closely controlled atmospheric conditions required for highly reliable hermetic sealing. They are dust-free, orderly and spotlessly clean.

With clearances frequently measured in micro-inches for hermetically sealed relays and controls specified in the latest aircraft, missile and astronautical equipment, even the smallest speck of dust, lint, or foreign substance could clog moving parts or impair their operating efficiency. Metallic dust particles would produce galvanic corrosion with the known result.

Guardian eliminates such particles from the atmosphere of its "Clean Rooms". The atmosphere is continuously cleaned and maintained at a minimum dust count to meet critical sealing requirements.

All personnel wear lint-free hoods, shoe coverings, gloves and coats. They enter Guardian "Clean Rooms" through pressurized locks. All relays, enclosures, cables and essential parts are completely pre-cleaned before entering "Clean Rooms" and are ultrasonically scoured before and after assembly. Final operations include vacuum baking for complete demoisturization.



demoisturizing

TESTED visually-mechanically-electrically-environmentally-combining experience, skill and the finest of test equipment

◆ The role of the design engineer who specifies hermetically sealed controls for aircraft, missile systems and military equipment has greatly increased in responsibility. This accounts for more exacting testing procedures. To the right foreground, units are expertly checked while testing open and sealed relays. After each operation, prior to sealing, the control units are contained within vacuum bottles. Meantime, exhaust hoods at the wall are constantly removing fumes during the sealing cycle. At Guardian we constantly test the testing equipment itself in order to deliver thoroughly cleaned and expertly tested controls in the final sealed assembly.



final electrical testing

RECTIFICATION NETWORKS

Guardian Electric in conjunction with its established line of D.C. relays offers a new line of small and light weight rectified A.C. relays. These relays utilize environmentally proven D.C. magnetic structures in conjunction with negligible weight silicon type rectification networks. This design approach creates mechanically interchangeable A.C. and D.C. units with a negligible weight increase for the A.C. version, and is a great improvement over A.C. relays utilizing alternating current magnetic structures which are by nature substantially heavier, larger and less efficient than their D.C. counterparts.

Wherever optimum environmental performance is required full wave, four element rectification networks are used. In some cases, two element half wave rectification networks can be satisfactorily used, depending upon the severity of the environmental requirements. It follows that realistic A.C. relay requirements should be specified in order to determine the type of rectification network required.

The rectification elements utilized by Guardian Electric are the best obtainable. Our A.C. units utilizing these elements will give reliable performance when used in circuitry where peak voltage and current surges do not exceed the rectifier's limitations. Many of the D.C. relays in this catalog can be manufactured for A.C. operation up to 400 c.p.s.

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Relays pictured here carry full MS approval in addition to meeting all requirements of MIL-6106-B. The MS-25024-2 unit includes the minimum current requirement. All three relays have the same interchangeable mountings as the controls featured in the "Interchangeable Aircraft Relay" section (see pages 6 and 7) of this catalog.

Technical drawing of a rectangular metal component, likely a terminal block or connector. The drawing shows the component from a top-down perspective, highlighting its rectangular shape and various mounting features.

Key dimensions and features labeled on the drawing include:

- Overall width: 2.687"
- Overall height: 2.625"
- Top edge dimensions: 1.250" (left section), 1.87" (middle section), 3.312" MAX. (right section), and 2.937" MAX. (right section).
- Left edge dimensions: .562" (top section) and 2.625" (bottom section).
- Internal width dimensions: 1" (left section), 1.87" (middle section), and 2.109" MAX. (middle section).
- Bottom edge dimensions: .060" MIN. (left section), 1" (middle section), 1.250" (right section), and .750" (right section).
- Mounting holes: (14) 6-32 x 5/16" TERMINAL SCREWS (left side), (12) MTG. HOLES .173" DIA. (right side).
- Other labels: "X" marks on the left side, "2" and "3" indicating hole positions, and "1" indicating a hole position.



MS-25035-1—MIL-R-6106-B

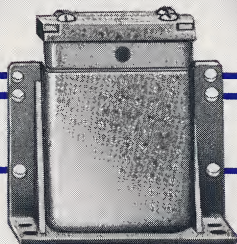
D-5



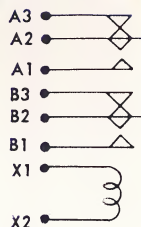
GUARDIAN

Interchangeable

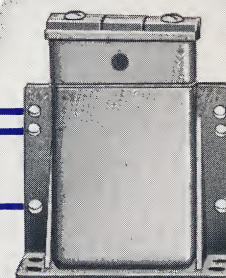
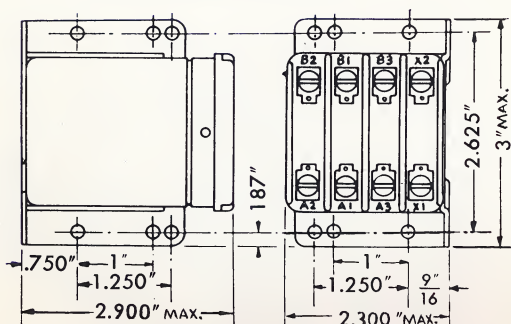
AIRCRAFT



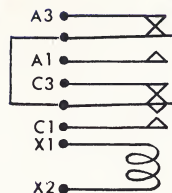
10 Amp.
D.P.D.T.



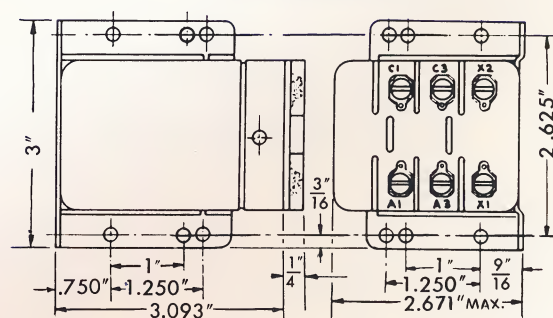
G-56278-B



10 Amp.
S.P.D.T.
Time Delay



G-54509



S P E C I F I C A T I O N S

G-56278-B

Maximum Operating Voltage: 29 volts dc

Pick-Up Voltage: 18 volts dc

Drop-Out Voltage: 7 volts + 0-5.5

* Nominal Coil Voltage: 24-28 volts dc

Coil Current: .230 amp maximum

Minimum Operating Cycle: 50,000

Minimum Operating Period: 3 hours

Rated Duty: continuous

Dielectric Strength:

2500 volts RMS contacts
1000 volts RMS coil

Operating Temperature: -65° C to +71° C

Contact Arrangement: DPDT

Contact Rating: Resistive DC—10 amp

Resistive AC @ 115 volts—400 cycles—15 amp

Inductive DC—10 amp

Motor DC—6 amp

Terminals: screw type

Weight: .53 lbs. max.

Vibration Resistance: 10 G's (10 to 500 cycles)

Seal: hermetic

Applicable Specifications: MIL-R-6106

G-54509

Maximum Operating Voltage: 29 volts dc

Pick-Up Voltage: 22 volts dc max.

Drop-Out Voltage: 7 volts + 0-5.5 (70°)

* Nominal Coil Voltage: 24-28 volts dc

Coil Current: .30 amp maximum

Minimum Operating Cycle: 50,000

Minimum Operating Period: 3 hours

Operate and Release Time:

time delay

.05 sec. (slow operate)

at 24 v. dc

Rated Duty: continuous

Dielectric Strength: 2000 volts RMS contacts

1000 volts RMS coil

Operating Temperature: -65° C to +71° C

Contact Arrangement: SPDT

Contact Rating: Resistive DC—10 amp

Resistive AC @ 115 volts—400 cycles—15 amp

Inductive DC—10 amp

Motor DC—6 amp

Terminals: screw type

Weight: .75 lbs. max.

Vibration Resistance:

10 G's (10 to 55 cycles) + 5 G's to 200 cycles

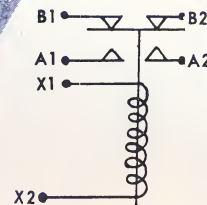
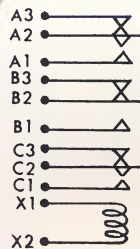
Seal: hermetic

Applicable Specifications: MIL-R-6106

*These relays are also available for ac operation up to 400 CPS.

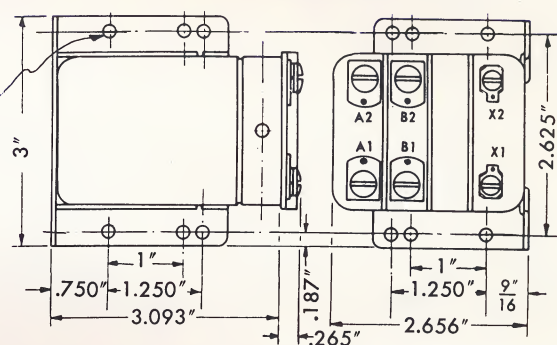
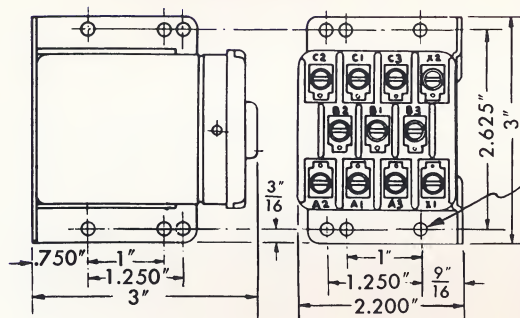
**10 Amp.
3 P.D.T.**

G-55910



**25 Amp.
S.P.D.T.**

G-54554



S P E C I F I C A T I O N S

G-55910

Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc
Drop-Out Voltage: 7 volts + 0-5.5
***Nominal Coil Voltage:** 24-28 volts dc
Coil Current: .175 amp maximum
Minimum Operating Cycle: 50,000
Minimum Operating Period: 3 hours
Rated Duty: continuous
Dielectric Strength: 2500 volts RMS contacts
 1000 volts RMS coil
Operating Temperature: -65° C to +71° C
Contact Arrangement: 3 PDT
Contact Rating: Resistive dc—10 amp
 Resistive ac @ 115 volts—400 cycles—15 amp
 Inductive dc—10 amp
 Motor dc—6 amp
Terminals: screw type
Weight: .55 lbs. max.
Vibration Resistance: 10 G's (10 to 55 cycles)
 + 5 G's to 200 cycles
Seal: hermetic
Applicable Specifications: MIL-R-6106

G-54554

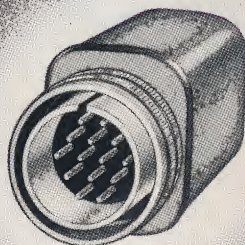
Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc
Drop-Out Voltage: 7 volts + 0-5
***Nominal Coil Voltage:** 24-28 volts dc
Coil Current: .25 amp maximum
Minimum Operating Cycle: 50,000
Minimum Operating Period: 3 hours
Rated Duty: continuous
Dielectric Strength: 1000 volts RMS
Operating Temperature: -65° C to +71° C
Contact Arrangement: SPDT
Contact Rating: Resistive dc—25 amp
 Resistive ac @ 115 volts—400 cycles—25 amp
 Inductive dc—20 amp
 Motor dc—20 amp
Terminals: screw type
Weight: 13 ounces max.
Vibration Resistance: 10 G's (10 to 55 cycles) + 5 G's to 200 cycles
Seal: hermetic
Applicable Specifications: MIL-R-6106

*These relays are also available for ac operation up to 400 CPS.



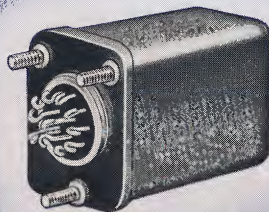
AN Approved Relays . .

The AN approved relays on this page are hermetically sealed to government specifications. They are available in voltages and contact combinations other than those shown for industrial as well as military specifications.



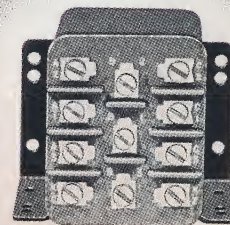
3 Amp.
4 P.D.T.

AN 3303-1



3 Amp.
4 P.D.T.

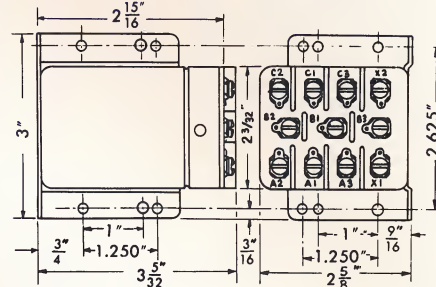
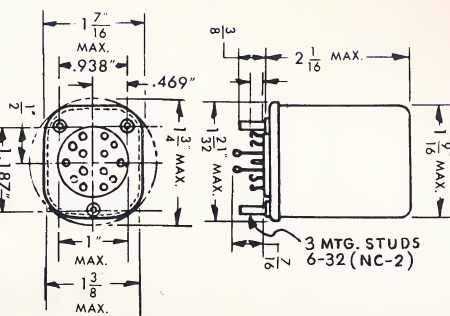
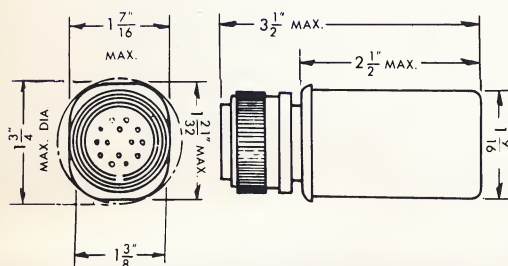
AN 3304-1



10 Amp.
3 P.D.T.

AN 3312-1 — AN 3312-2

(12) MTG. HOLES .173" DIA.



S P E C I F I C A T I O N S

AN3303-1

Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc
Drop-Out Voltage: 7 volts dc + 0 — 5
*** Nominal Coil Voltage:** 24-28 volts dc
Coil Current: .150 amp maximum
Minimum Operating Cycle: 50,000
Minimum Operating Period: 3 hours
Rated Duty: continuous
Operating Temperature:
 —65° C to +71° C
Contact Arrangement: 4 PDT
Contact Rating:
 Resistive DC—3 amp
 Resistive AC @115 volts—400 cycles—3 amp
 Inductive DC—1.5 amp
 Motor DC—1.5 amp
Terminals: (14) Pin Connector
 #157-220-27P
Weight: 0.5 lbs. max.
Vibration Resistance: 10 G's (10 to 55 cycles)
Seal: hermetic
Applicable Specifications:
 AN 3303-1—MIL-R-6106-B

AN3304-1

Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc
Drop-Out Voltage: 7 volts dc + 0 — 5
*** Nominal Coil Voltage:** 24-28 volts dc
Coil Current: .150 amp maximum
Minimum Operating Cycle: 50,000
Minimum Operating Period: 3 hours
Rated Duty: continuous
Operating Temperature:
 —65° C to +71° C
Contact Arrangement: 4 PDT
Contact Rating:
 Resistive DC—3 amp
 Resistive AC @115 volts—400 cycles—3 amp
 Inductive DC—1.5 amp
 Motor DC—1.5 amp
Terminals: solder lug type
Weight: 0.4 lbs. max.
Vibration Resistance:
 10 G's (10 to 55 cycles)
Seal: hermetic
Applicable Specifications:
 AN 3304-1—MIL-R-6106-B

AN3312-1 — AN3312-2

Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc
Drop-Out Voltage: 7 volts dc + 0 — 5.5
*** Nominal Coil Voltage:** 24-28 volts dc
Coil Current: .35 amp maximum
Minimum Operating Cycle: 50,000
Minimum Operating Period: 3 hours
Rated Duty: continuous
Dielectric Strength: 1000 volts RMS
Operating Temperature:
 —65° C to +71° C
Contact Arrangement: 3 PDT
Contact Rating:
 Resistive DC—10 amp
 Resistive AC @115 volts—400 cycles—15 amp
 Inductive DC—10 amp
 Motor DC—6 amp
Terminals: screw type standard
Weight: 0.8 lbs. max.
Vibration Resistance: 10 G's (10 to 55 cycles)
Seal: hermetic
Applicable Specifications:
 AN 3312-1—MIL-R-6106-B
 AN 3312-2—MIL-R-6106-B
 (including min. current)

*These relays are also available for ac operation up to 400 CPS

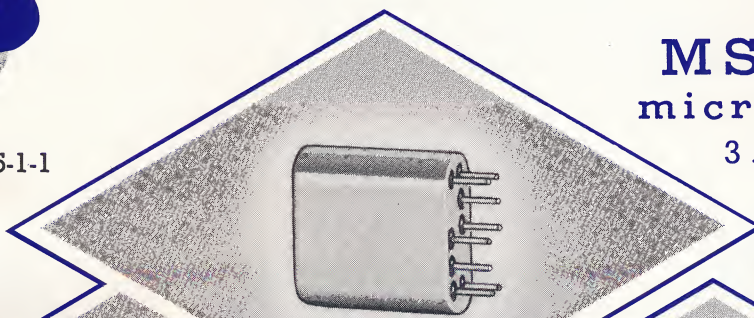
D-9



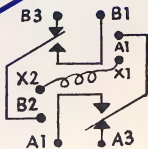
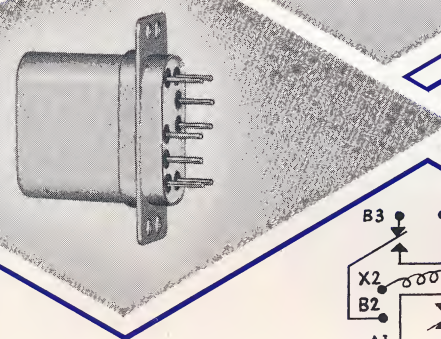
Aircraft and Missile Relays

MS-24250-6
micro-miniature
3 Amp. D.P.D.T.

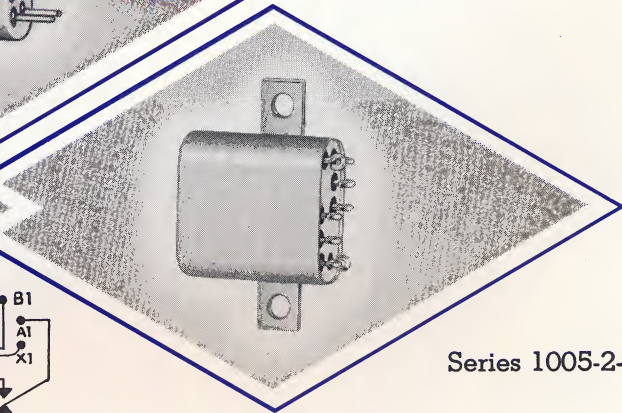
Series 1005-1-1



Series 1005-1-2



Series 1005-2-3

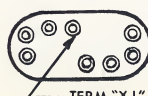
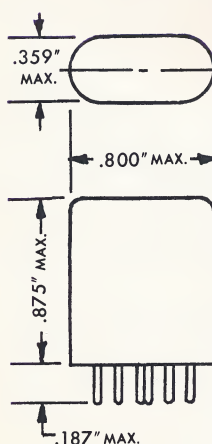


Series 1005 RELAY

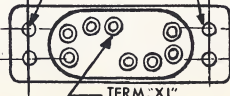
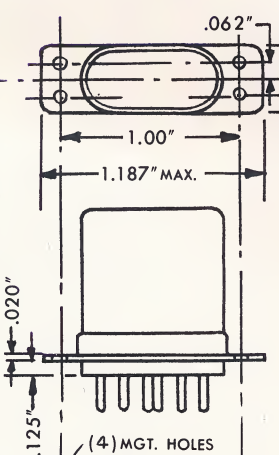
Concentrating maximum power in minimum space, the Series 1005, is the leader in micro-miniature relays. A few of the outstanding features are:

- Standard contact rating 3 amperes @ 125°C.
- Applicable specifications MIL-R-25018 and MS-24250-6.
- Switches currents as low as 10 microamps at 30 millivolts.
- "Fluxless Solder" sealing eliminates possibilities of internal contamination.
- With the exception of coil lead splices (which are soldered) all internal electrical connections are welded.
- All production is 100% Mass Spectrometer leak tested.
- Complete Certified Test Reports are available.
- Unit is available in a variety of mounting arrangements and header terminations. (See drawings below.)

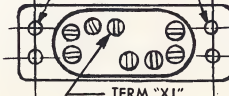
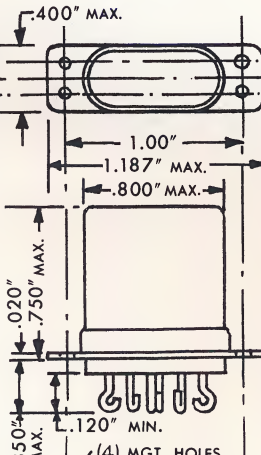
1005-1-1



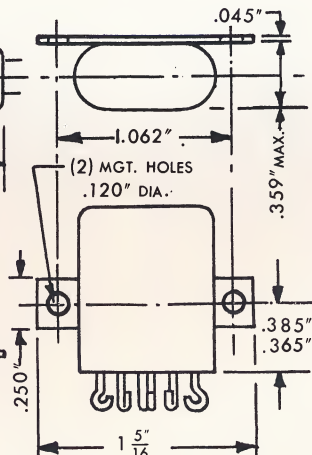
1005-1-2



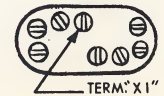
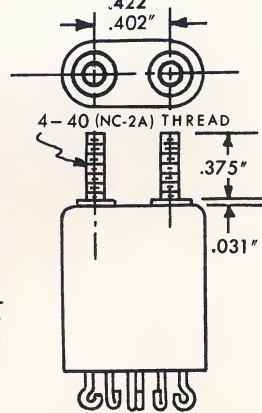
1005-2-2



1005-2-3



1005-2-4



... by GUARDIAN

SERIES 1005 RELAY SPECIFICATIONS

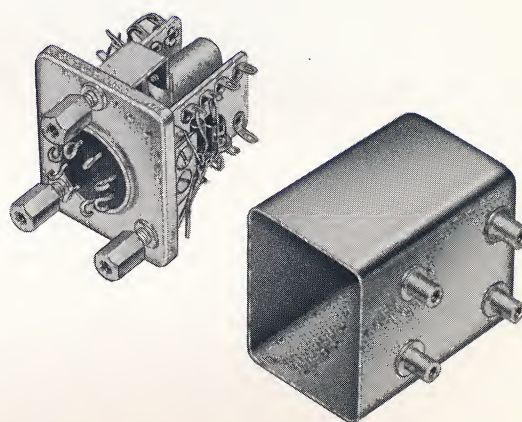
Contact Arrangement: DPDT
Contact Rating: 3 amps non-inductive load
 at 28 volts dc @ +125° C
Operating Voltage: 26.5 volts dc nominal, 32 volts dc maximum
Pull-In: 18 volts dc maximum
Release: 8 volts dc maximum, 1 volt dc minimum
Operate and Release Time: 6 milliseconds maximum
Rated Duty: continuous
Operating Temperature: -65° C to +125° C
Coil Resistance: 600 ohms $\pm 10\%$
Insulation Resistance: 10,000 megohms minimum
 at 100 volts dc @ 25° C

Dielectric Strength: 1000 volts RMS (750 volts RMS across contacts) at sea level
Seal: hermetic (dry nitrogen)
Vibration Resistance: 20 G's minimum to 2000 CPS per MIL-R-5757-C, 15 G's to 1500 CPS per MIL-R-25018
Shock: 50 G's minimum for 11 milliseconds
Life Test: 100,000 operations minimum at rated contact load, at +125° C
Weight: 0.35 ounces (type 1005-1-1) 0.41 ounces (type 1005-2-2)
Applicable Specifications: MIL-R-25018, class-B. MS-24250-6

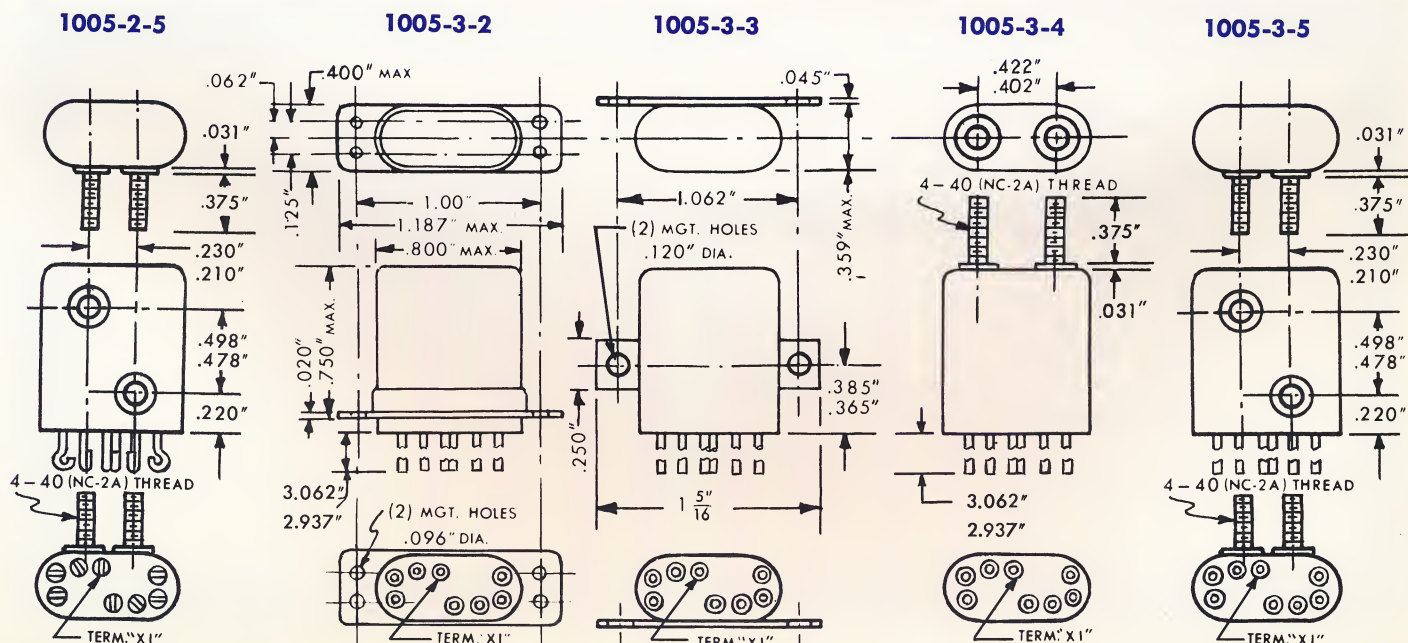
CLOSE DIFFERENTIAL RELAY

Magnetic relays inherently have a substantial spread between attract or pull-in and release or drop-out points. The average magnetic relay will release at approximately 50 percent of its attract value unless special considerations are given to break up the magnetic circuit in the energized position. In the present state of the art, sundry devices such as residual screws, residual strips, and non-magnetic plating are used to somewhat decrease this differential. The use of a residual is not desirable from the standpoint of shock and vibration resistance in the energized position since there is a subsequent decrease in magnetic holding power.

Engineers at Guardian Electric have developed a network utilizing static devices in conjunction with the Guardian Series 1005 relay. This creates the ultimate in close differential requirements without the use of mechanical devices. This close differential has double pole, double throw, contacts rated same as the Guardian Series 1005 relay. The operating voltage is 24 ± 2 volts; the release voltage is $22 \text{ volts} \pm 2 \text{ volts}$. The maximum differential between attract and release is 2 volts. The foregoing values are applicable over a temperature range of -65° C. to +125° C. The unit is hermetically sealed in a housing similar to AN-3304-1.



Above photos show a Guardian Close Differential Relay with enclosure. The relay has hook-type header pins with 3-stud mounting, or available with 4 stud mounting on side of enclosure as shown above.

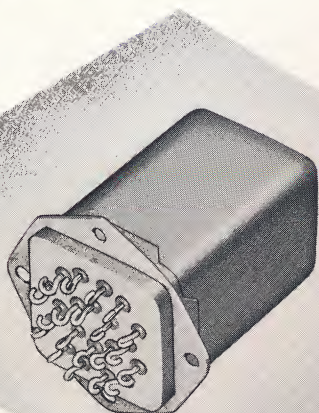




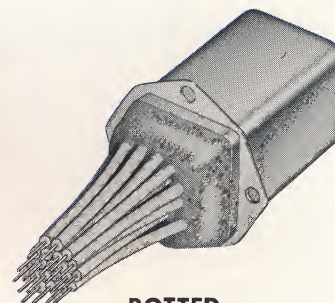
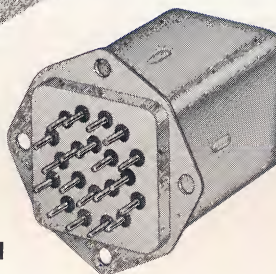
Aircraft and Missile Relays . . .

Series 2005 6 P.D.T., 5 ampere sub-miniature Guardian relay meets and exceeds all requirements of Specification MIL-R-5757-C Class A and Class B. All contacts on this relay are staked—not welded—for utmost reliability. The internal connections are from the coil terminals to header pins. Terminations available are solder hook-type, plug-in, or potted leads.

**5 Amp.
6 P.D.T.**



PLUG-IN

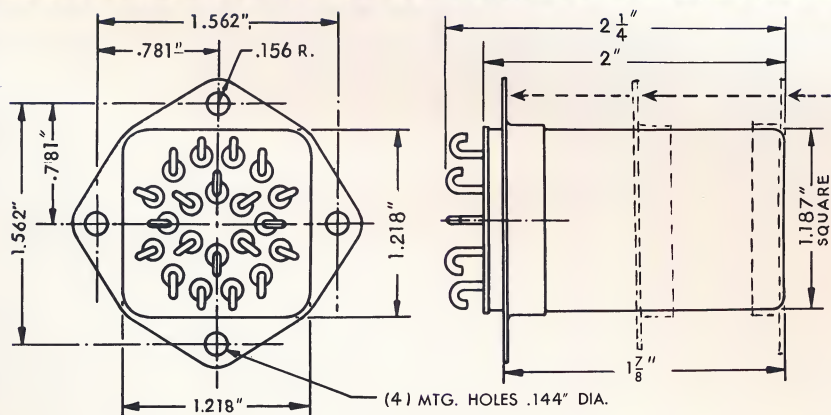


POTTED

S P E C I F I C A T I O N S

Maximum Operating Voltage: 30 volts dc
Pick-Up Voltage: 18 volts dc maximum
Drop-Out Voltage: .75—7 volts dc @ 25° C
Coil Resistance: 190 ohms $\pm 10\%$
Minimum Operating Cycle: 100,000
Rated Duty: continuous
Dielectric Strength: 1000 volts RMS
Operating Temperature: -65° C to +125° C
Contact Arrangement: 6PDT

Contact Rating: 5 amps resistive @ 30 volts dc
Terminals: solder lug type is standard. Also available with potted leads or plug-in. Mating connector for plug-in relay is available from Guardian
Weight: .29 lbs. maximum
Vibration Resistance: 10 G's minimum 10 to 2000 cycles
Seal: hermetic
Applicable Specification: MIL-R-5757-C—Class A and Class B
 This relay also available for ac operation up to 400 CPS

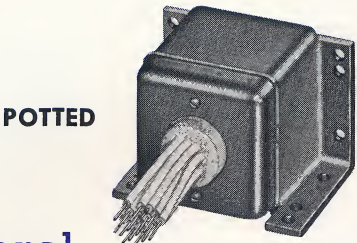


ALTERNATE MOUNTINGS

The four-hole mounting bracket can be supplied at any position on enclosure for recessed or flush mounting.

Series 3005 Rotary type relay has contact combination of 4 P.D.T. with 10 ampere rating. Standard coil voltage is 24-28 Volts D.C. Also available with rectification network for A.C. operation up to 400 c.p.s. Terminations are screw type, or with potted leads. Series 3005 relay is available in three versions—G-60001, G-58473 and G-59243. Variations for each of three versions are indicated under specifications listed below.

MS-24568-D1



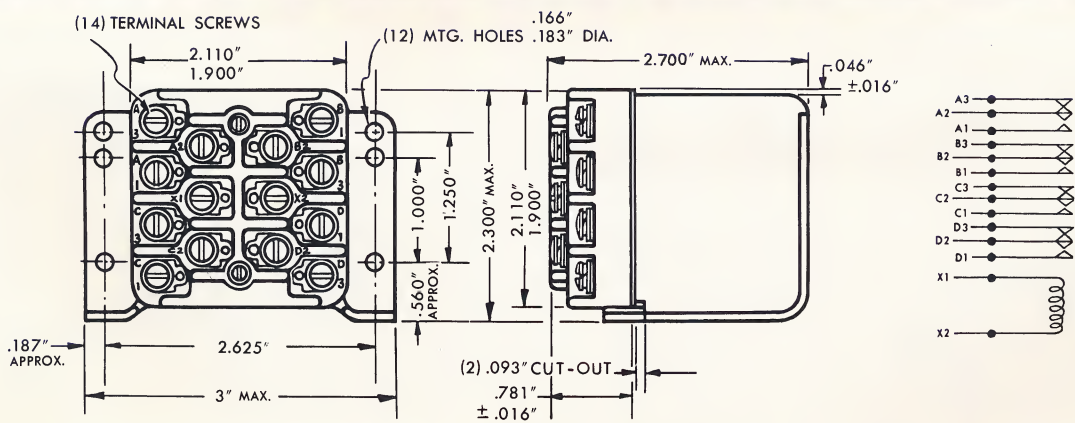
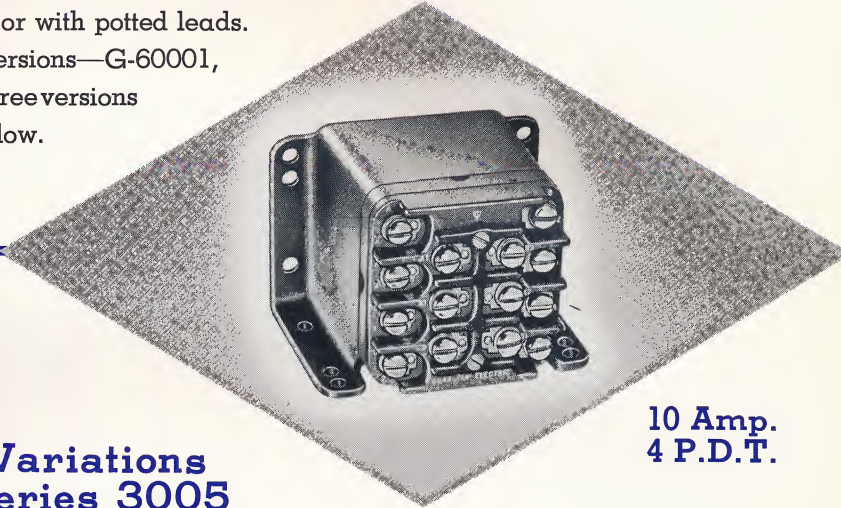
**General
Series 3005
Specifications**

Maximum Operating Voltage: 30 volts dc
Pick-Up Voltage: 18 volts dc maximum
Drop-Out Voltage: 7 volts dc $\pm 0-5.5$
Nominal Coil Voltage : 24-28 volts dc
Dielectric Voltage Breakdown: 2,000 volts
(60 cycles) for 60 seconds
Rated Duty: continuous
Contact Arrangement: 4 P.D.T.
Terminals: screw type standard, also
available with potted leads
(see photo above)
Weight: .69 lbs. maximum

NOTE: General Specifications to the left
above apply to all variations
listed to the right above.

**Variations
Series 3005
Specifications**

	G-60001	G-58473	G-59243
Coil Current:	.350 amp max	.500 amp max	.500 amp max
Minimum Operating Cycle:	50,000	50,000	100,000
Temperature Range:	-65° C to +71° C	-65° C to +95° C	-65° C to +120° C
Contact Rating:			
resistive dc	10 amp	10 amp	10 amp
resistive ac @ 115 volts—400 cycles	15 amp	10 amp	15 amp
inductive dc	10 amp	10 amp	10 amp
motor dc	6 amp	6 amp	6 amp
lamp dc @ 28 volts or @ 115 volts ac—400 cycles			3 amp
Vibration Resistance:	10 G's to 1000 cycles	15 G's to 1000 cycles + 10 G's from 1000 to 2000 cycles	20 G's 36-500 cycles + 15 G's 500—1000 cycles + 10 G's 1000 to 2000 cycles
Applicable Specifications:	MIL-R-6106-A	MIL-R-6106-C Including minimum current	MIL-R-6106-C MS-24568-D1



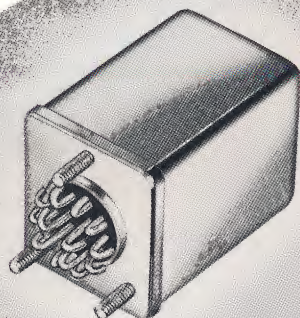


Aircraft and Missile Relays . . .

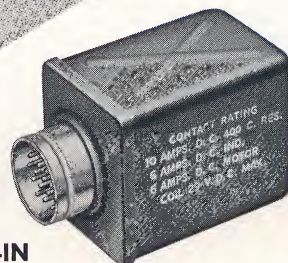
Series 3205

The Series 3205 meets and exceeds test requirements of Specification MIL-R-6106-B, Class B, including temperature and vibration requirements. This 4 P.D.T., 10 ampere relay is mounted in the same container as the AN-3304 (4 P.D.T. 3 ampere relay) and is approximately the same weight. Terminals available include solder hook, plug-in, and potted leads.

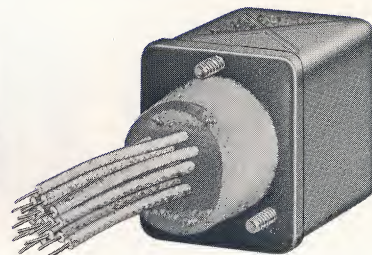
**10 Amp.
4 P.D.T.**



PLUG-IN



POTTED



S P E C I F I C A T I O N S

Maximum Operating Voltage: 29 volts dc
Pick-Up Voltage: 18 volts dc maximum
Drop-Out Voltage: 6.7 volts dc max. @ 25° C. 8 volts
 +0—6.5 dc @ 120° C
Nominal Coil Voltage*: 24-28 volts dc
Coil Resistance: dc—200 ohms +20%—30%
Minimum Operating Cycles: 50,000
Minimum Operating Period: three hours
Rated Duty: continuous
Dielectric Strength: 1000 volts RMS
Operating Temperature: —65° C to +120° C
Contact Arrangement: 4PDT

*This relay also available for ac operation up to 400 CPS

Contact Rating: resistive dc—10 amp
 resistive ac @ 115 volts—400 cycles—10 amp
 inductive dc—6 amp
 motor dc—6 amp

Overload: resistive dc—100 cycles @ 40 amp 20/30 cycles per minute
 resistive ac—100 cycles @ 40 amp 20/30 cycles per minute

Terminals: solder lug type is standard. Also available with potted leads or plug-in. Mating connector for plug-in relay is available from Guardian

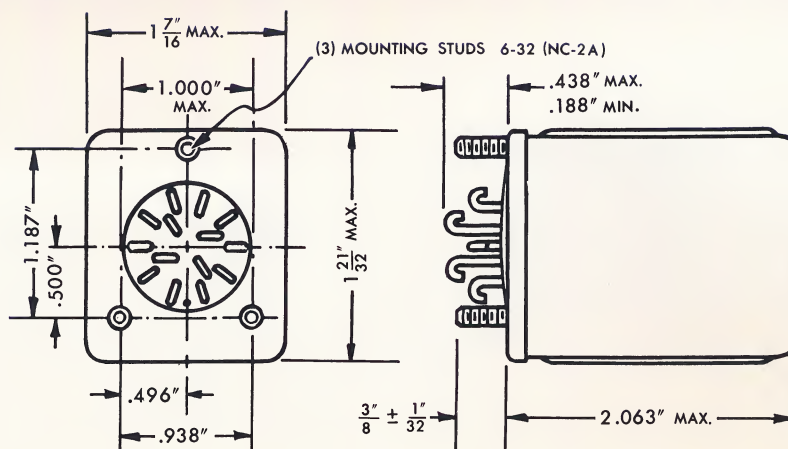
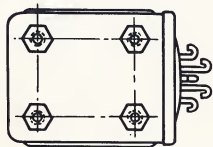
Weight: 0.45 lbs.

Vibration Resistance: 10 G's (10 to 500 cycles)

Seal: hermetic

Applicable Specification: MIL-R-6106-B, class-B

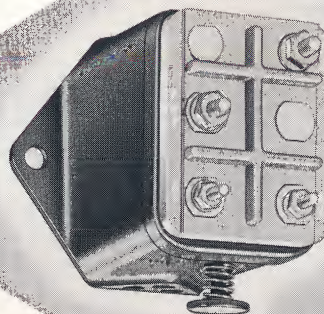
ALTERNATE MOUNTINGS
 Also available with 3 or
 with 4 mounting studs on
 side of enclosure.



... by GUARDIAN

Reverse Current Contactor

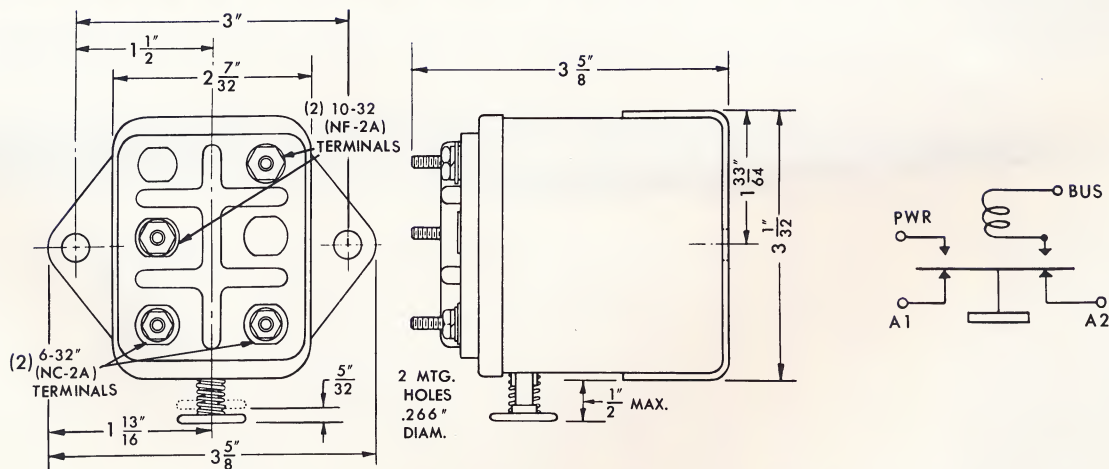
This is a combination electromagnetic permanent magnet device designed to operate upon current reversal. The coil circuitry of this unit is in series with a normally closed contact. As long as coil current flow is in a "forward" direction an auxiliary normally open contact remains in an open position.



Upon current reversal to a pre-set magnitude the unit will trip to a "fail-safe" position causing the auxiliary contact to close. Manual operation by means of an external push button is required in order to reset from the "fail-safe" position to a "set" or "normal" position.

The auxiliary contact is rated at 50 amperes, 28 volts D.C. The standard unit will trip within the range of 10-30 amperes reverse current. The continuous forward current rating is 50 amperes with surges limited to 1,000 amperes.

Although the 10-30 amperes trip current of the standard unit is satisfactory for most applications, special trip current ranges can be supplied upon request.





GUARDIAN

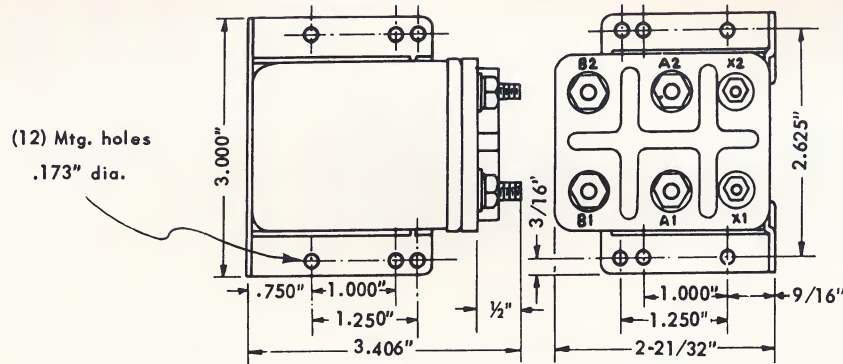
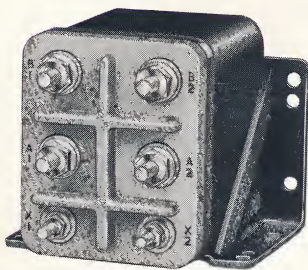
Hermetically Sealed

SOLENOID CONTACTORS

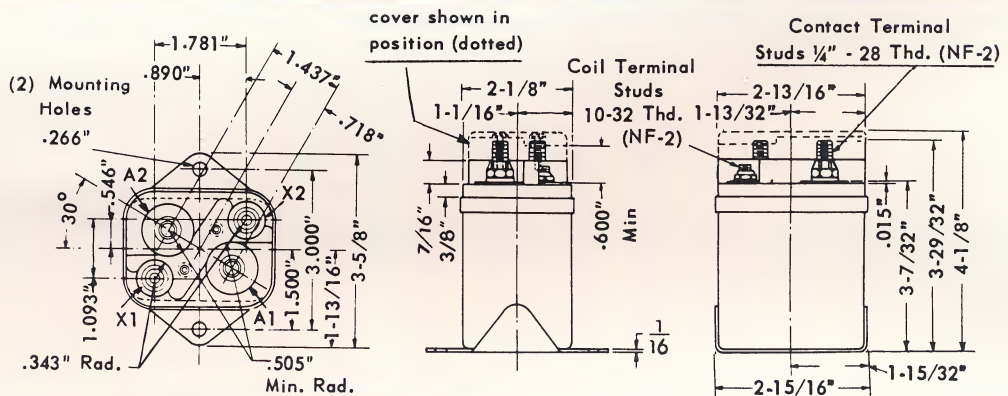
Guardian Solenoid Contactors have long been standard equipment for the aircraft industry. These hermetically sealed units meet and exceed all requirements of MIL-R-6106-B. The 200 ampere G-54978-A contactor is approved as MS-25033-1.

Units are furnished with all terminals on the top to eliminate difficulties of inaccessibility. Sturdy barrier construction on face plates prevents any possible "shorting" of terminals. A 250 ampere unit can also be supplied with surge, overload and rupture ratings as applicable to the 200 ampere unit.

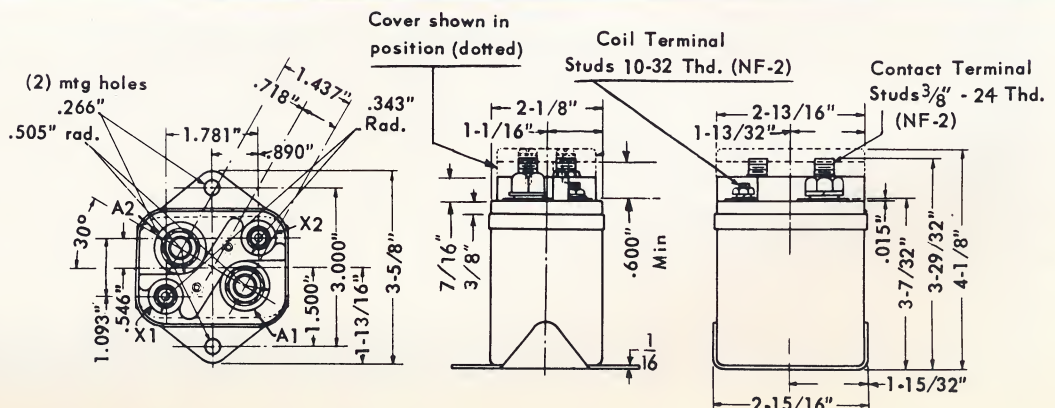
SEALED 50 AMP.



SEALED 100 AMP.



SEALED 200 AMP.



Guardian Part Number	CONTACTS			COIL				Terminal Bolts	Weight
	Amp. Rating Main Contact	Surge Amp. Rating	Main Contact Combination	Amps. at Rtd. Vlt.	Standard Voltage	Pick-Up Voltage	Cont. or Int. Duty		
G - 55335-A	N. O. 50 N. C. 25	N. O. 300 N. C. 150	S.P.D.T.	.5	24	18	Cont.	Coil (2) 6-32 NC-2 Cont.(4) 10-32NF-2	20.8 oz.
G - 55759-A	100	600	S.P.S.T.	.5	24	18	Cont.	Coil (2) 10-32NF-2 Cont. 1/4" 28 NF-2	31 oz.
MS-25033-1 G - 54978-A	200 ★	1200	S.P.S.T.	.5	24	18	Cont.	Coil (2) 10-32NF-2 Cont. (2) 3/8" 24NF-2	32 oz.

★ ALSO AVAILABLE—250 Ampere Unit—with surge, overload and rupture ratings as applicable to 200 Ampere unit.

50 Ampere Specifications Part No. G-55335-A

Maximum Operating Voltage: 29 volts dc

Pick-Up Voltage: 18 volts dc

Drop-Out Voltage: 7 volts dc + 0—5.5

Nominal Coil Voltage: 24-28 volts dc

Coil Current: .5 amp maximum

Minimum Operating Cycle: 50,000

Minimum Operating Period: 3 hours

Rated Duty: continuous

Dielectric Strength: 1000 volts RMS

Operating Temperature: —65° C to +71° C

Contact Arrangement: SPDT

Contact Rating:

	N.O.	N.C.
Resistive DC.....	50 amp....	25 amp
Resistive AC @ 115 volts—400 cycles....	75 amp....	50 amp
Inductive DC.....	50 amp....	25 amp
Motor DC.....	50 amp....	25 amp

Terminals: terminal bolts (see chart)

Weight: 1.3 lbs. max.

Vibration Resistance: 10 G's (10 to 55 cycles)

Seal: hermetic

Applicable Specifications: MIL-R-6106-B

100 Ampere Specifications Part No. G-55759-A

Maximum Operating Voltage: 29 volts dc

Pick-Up Voltage: 18 volts dc

Drop-Out Voltage: 7 volts dc + 0—5.5

Nominal Coil Voltage: 24-28 volts dc

Coil Current: .5 amp maximum

Minimum Operating Cycle: 50,000

Minimum Operating Period: 3 hours

Rated Duty: continuous

Dielectric Strength: 1000 volts RMS

Operating Temperature: —65° C to +71° C

Contact Arrangement: SPST-NO

Contact Rating: Resistive DC—100 amp

Inductive DC—50 amp

Motor DC—100 amp

Terminals: terminal bolts (see chart)

Weight: 1.93 lbs. max.

Vibration Resistance: 10 G's (10 to 55 cycles)

Seal: hermetic

Applicable Specifications: MIL-R-6106-B

200 Ampere Specifications Part No. G-54978-A MS-25033-1

Maximum Operating Voltage: 29 volts dc

Pick-Up Voltage: 18 volts dc

Drop-Out Voltage: 7 volts dc + 0—5.5

Nominal Coil Voltage: 24 volts dc

Coil Current: 0.5 amp maximum

Minimum Operating Cycle: 50,000

Minimum Operating Period: 3 hours

Rated Duty: continuous

Dielectric Strength: 1000 volts RMS

Operating Temperature: —65° C to +71° C

Contact Arrangement: SPST-NO

Contact Rating: Resistive DC—200 amp

Inductive DC—100 amp

Motor DC—200 amp

Terminals: terminal bolts (see chart)

Weight: 2.0 lbs. max.

Vibration Resistance: 10 G's (10 to 55 cycles)

Seal: hermetic

Applicable Specifications: MS 25033-1—MIL-R-6106-B

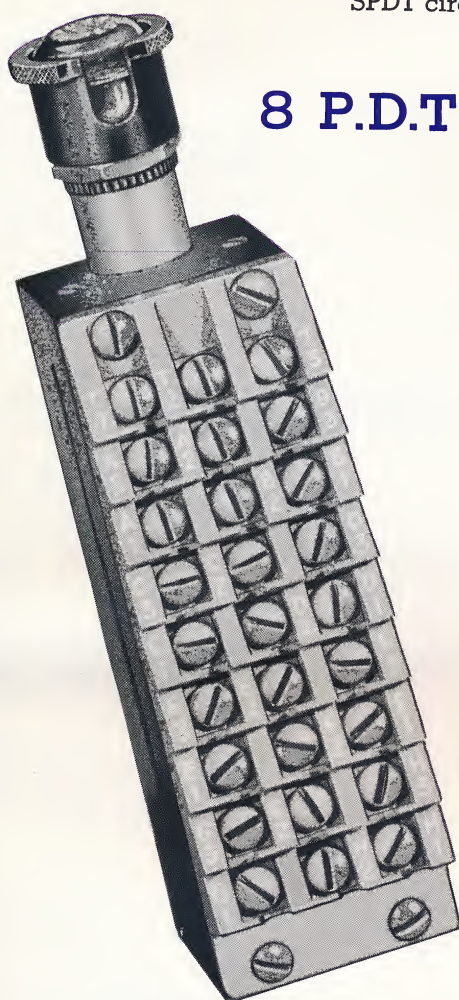


Multiple Contact CONTROL SWITCHES.

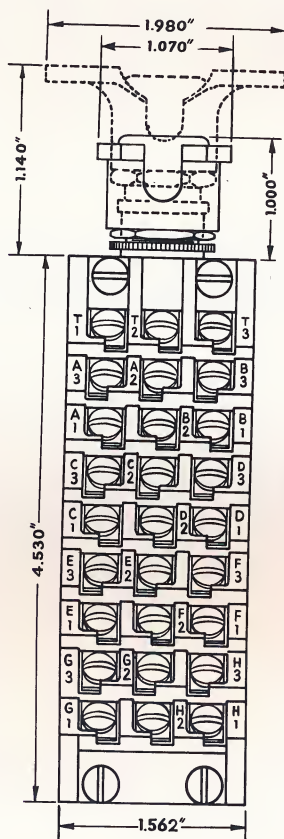
Positive Control of 8 Primary Circuits

Guardian 8 P.D.T. Master Switch Control Unit switches on or disconnects 8 primary circuits for complete control of multiple operations. Constant contact pressure (4 ounces per point) is maintained throughout the stroke until positive snap-action occurs in either direction. No dead center. Contacts handle inductive or motor loads of 5 amperes at 28 volts D.C.; resistive loads of 5 amperes at 115 volts A.C. 400 cycles. Built to exceed military specifications ANS-63 to resist shock and vibration and to operate at -65°F. to $+160^{\circ}\text{F.}$ Designed for easy multiple wiring to each terminal. Unit mounts on $1\frac{1}{2}'' \times 1\frac{1}{4}''$ panel area requiring no more space than 2 toggle switches. Termination of shaft can be modified to your specific applications. Micro finish bearing construction. Sand and dust type enclosure is easily removed for inspection. Unit is available with auxiliary "push-to-test" SPDT circuit and dial light. Weight is approximately 8 oz.

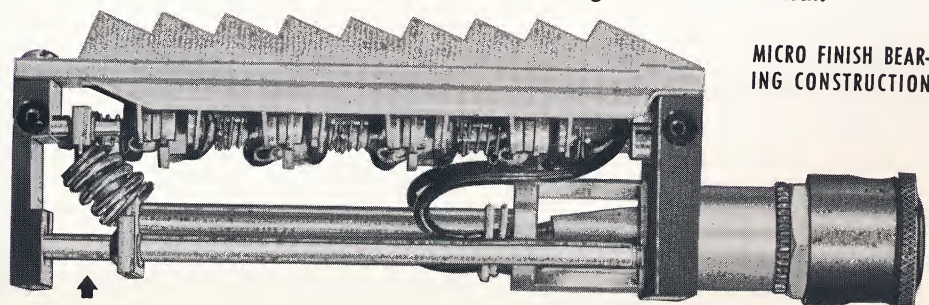
8 P.D.T.



8 P.D.T.



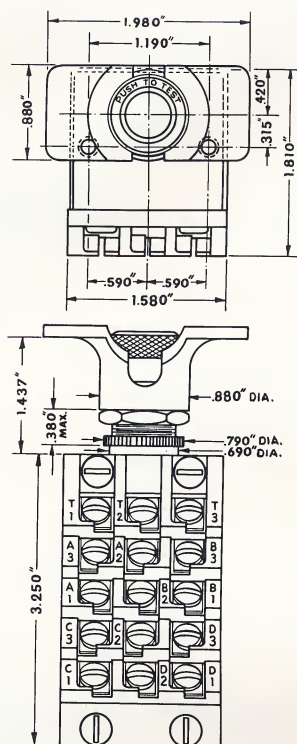
Designed for Easy Multiple Wiring to Each Terminal.



MICRO FINISH BEARING CONSTRUCTION

↑
SNAP-ACTION

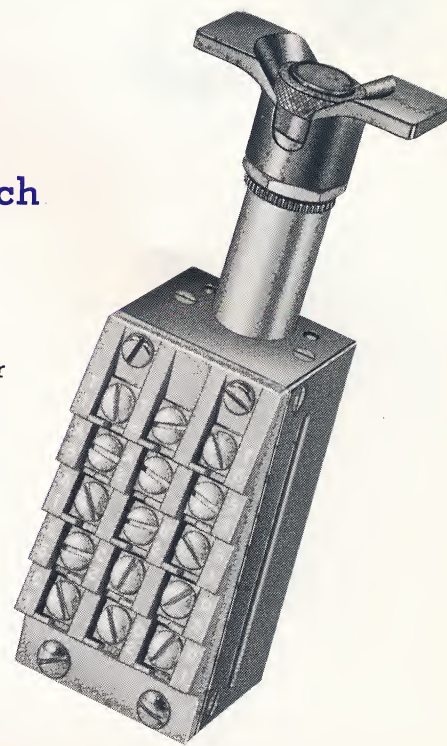
... by GUARDIAN



The Guardian 4 P.D.T. Switch

is similar in construction and operating characteristics to the 8 P.D.T. unit. It will switch or disconnect 4 primary circuits with constant contact pressure of 4 ounces per point. Contacts are rated at 5 amperes 28 volts D.C. inductive; 5 amperes 115 volts A.C. 400 cycles; 5 amperes 28 volts D.C. motor load. Weight of the 4 P.D.T. switch is 0.50 lbs. maximum.

4 P.D.T.

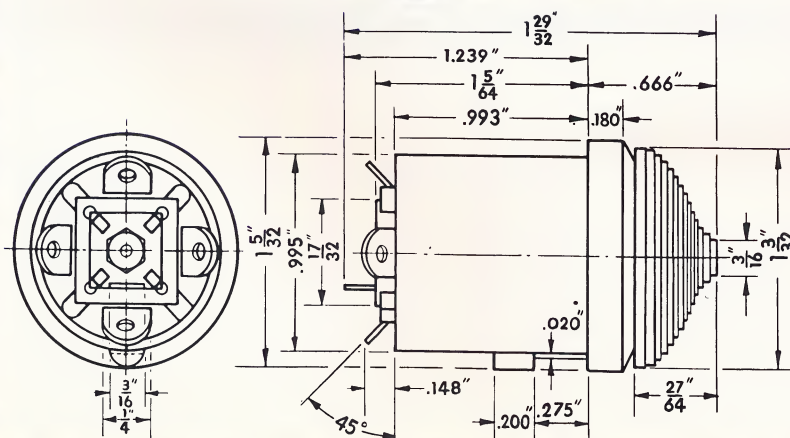
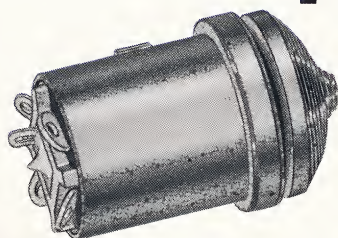
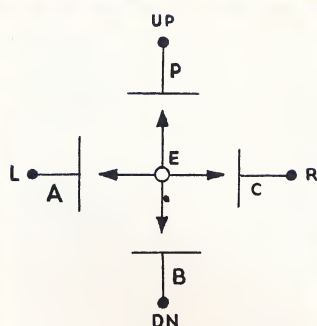


GUARDIAN FOUR-WAY SWITCH (20 AMP.)

G-57075

A fail-safe four-way switch designed to meet and exceed all test requirements of Spec. MIL-S-9419-B, incorporates the following features:

- Contacts make and break 20 amperes inductive load at 80,000 feet.
- Switch blades are of special alloy to give long life expectancy and reliability.
- Contacts can be mechanically broken in event of welding due to overload or short circuit.
- A shunt jumper and a center post shunt insure electrical operation and continuity under all operating conditions.
- Switch connections can be potted.

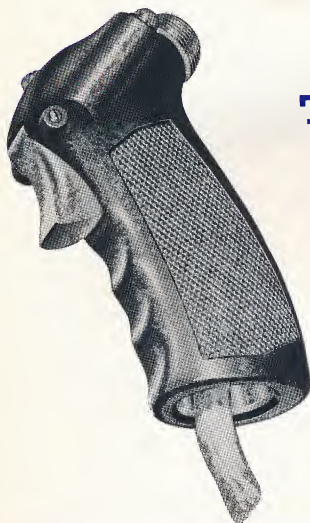




GRIP ASSEMBLIES

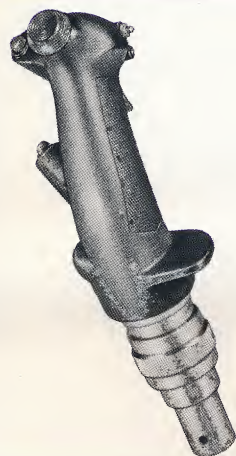
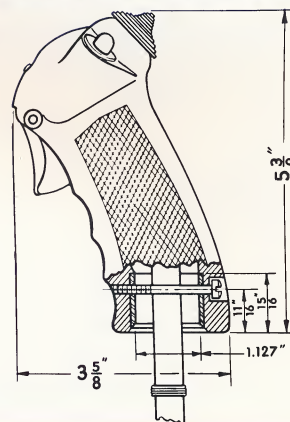
Controller Aircraft . . .

Compare the Guardian Grip assemblies shown here with the original 1941 models produced by Guardian and you will have some idea of the long strides made in the designs of today. These have evolved from latex dipped metal casting models with two insulated wires and a single trigger circuit, to the multi-functional molded plastic models shown which are so acceptable to aircraft designers.



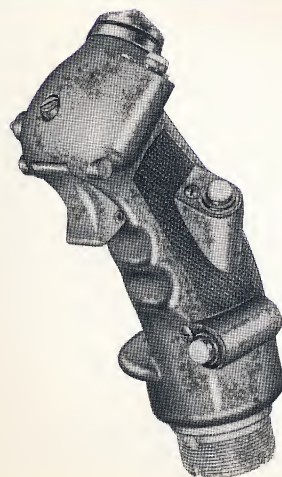
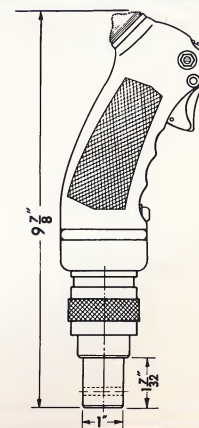
Type B-7-A Government Specification MIL-S-6652

Type B-7-A has a two position trigger switch. First and second positions are both SPST normally open. To operate, depress trigger closing circuit #1. Applying pressure thru detent maintains circuit #1 and closes circuit #2. Current rating—3 amperes 28 v. DC. Four-way trim switch operated by the thumb has five positions; up/down, left/right, with center "off". Current rating—3 amperes 28v. DC. The push button switch is SPST Normally Open with Current rating of 5 amperes 28 v. DC. Grip mounts with single screw. Electrical connections cable in vinyl sleeving 60" long.



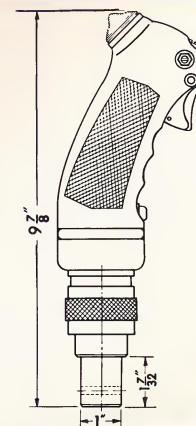
Type B-8 Government Specification MIL-S-5210

The type B-8 grip has two position trigger switch, 4-way trim switch, and SPST push-button switch, identical to the B-7-A. For control of microphone and radar, two SPST N.O., 5 ampere, push button switches were added. The grip mounts with quick disconnect AN connector.



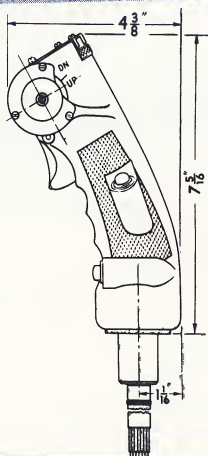
Type B-8-A Government Specification MIL-S-5210-C

Type B-8-A grip is identical in construction to the B-8 including the two position trigger switch and three SPST N.O. push button control switches. Newly incorporated in the B-8-A is the Guardian developed four-way trim switch rated for 20 amperes inductive at 24 volts D.C.



... by GUARDIAN

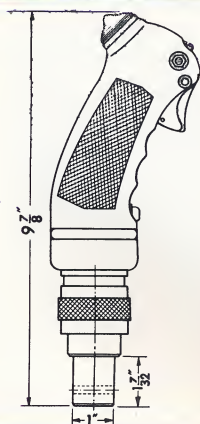
Progressively—Guardian has added the bomb release, 2-action gun camera trigger switch, microphone switch and many grips now carry up to 18 wires including radar control. Also the rocket button, the 4-Way switch for electronically controlled flying, nose wheel control and quick disconnect mounting are all ONE MAN and ONE HAND controlled.



The SERVO GRIP...

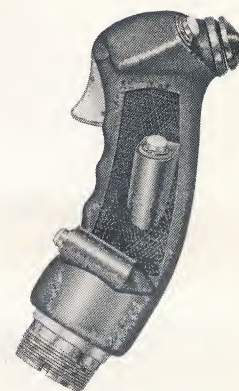
manufactured by Guardian for Chance Vought Aircraft features flight control through use of potentiometers. Thumb controlled calibrated knobs operate dual potentiometers which feed signals into amplifier to control the roll and up/down flight of the aircraft. The switch on side of grip operates SPST press on/press off circuit rated at 5 amperes resistive 28 volts D.C. The lower push-button switch and trigger switch are same as in the B-8-A grip.

The Servo grip is supplied with potted cable in vinyl tubing 60" long.



Type MC-2 Government Specification MIL-G25561

The MC-2 grip is similar to the B-8-A with Guardian's 20 ampere four way trim switch, and the three SPST N.O. push button control switches. The cartridge type two-position trigger switch rated at 3 amperes was changed to a new 5 ampere switch.



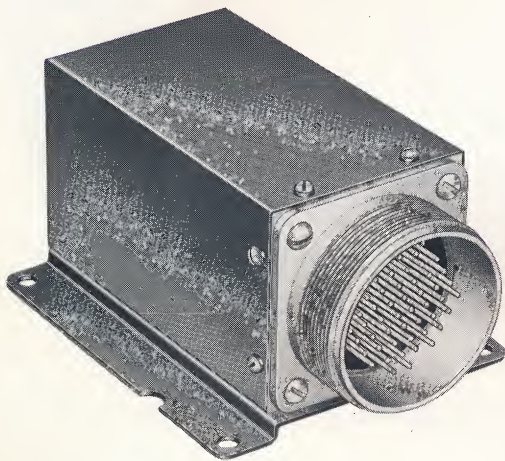
Type MC-3 (Proposed)

This is the latest in Jet Aircraft Controls. All switches are in the top portion of the MC-3 Grip for ease of operation. The MC-3 (Proposed) grip incorporates Guardian's newly developed two position trigger switch plus locking and non-locking miniature slide switches for SPST, 10 ampere resistive loads.





AIRCRAFT and MISSILE CONTROLS by GUARDIAN



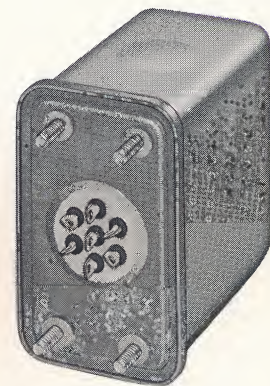
Custom Engineering of Multiple Packaging

Dimmer Control Assembly... This *custom designed* special circuit Guardian Dimmer Control incorporates a number of Guardian Series 1005 Relays which are multiple packaged within a single housing.

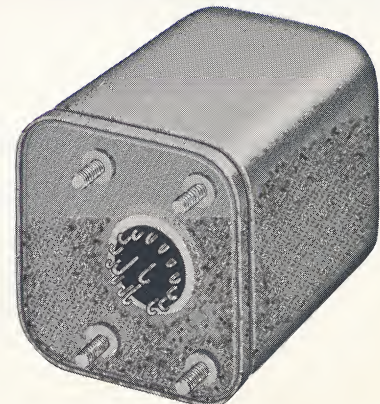
Guardian "came of age" in the custom designing of packaged controls during World War II when the present staff of Guardian engineers pioneered many vital controls for the Air Force, Signal Corps and other Government Departments. Guardian custom designed such controls as the bomb-salvo, T-series, intervalometer, gun grip switches and emergency communications, fire, alarm and lighting systems, among others. Alert to the needs of jet aircraft, missile systems and astronautical equipment Guardian today draws upon its vast custom design experience to build the highest reliability into packaged controls either open, enclosed, or hermetically sealed.

The obvious advantages of Guardian completely packaged controls are: (1) consolidation of wiring and connections, (2) conservation of space and weight reduction, (3) economy of buying, servicing and replacement from a single supplier and (4) the benefit of Guardian's long experience in the custom design of packaged controls.

Guardian special application controls are not necessarily relays or components. Such special controls are often designed in combination with motors, magnets, electron tubes and other units completely harnessed and cabled ready to plug-in.



G-57175. Two relays in one hermetically sealed enclosure.



G-58405. Four relays in one hermetically sealed enclosure.

GUARDIAN ... PROGRAMATION DIVISION

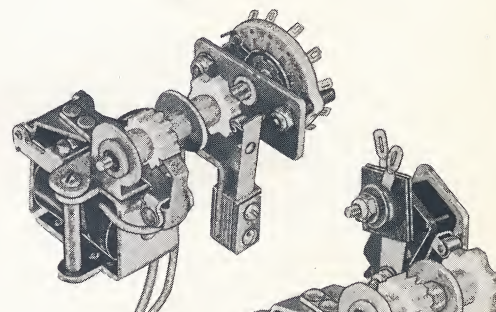
The Programation Division of Guardian Electric designs, develops and manufactures programming systems including automatic control equipment, automatic test equipment, automatic checkout gear, simulating devices and electronic and electro-mechanical systems. We have an active role in projects for atomic research, guided missile control, jet propulsion, astronautics, plus automated systems for industry. Our Programation Division's modern, fully equipped laboratories and manufacturing facilities are the finest. Creative imagination combines with specialized skill and practical experience in the fully staffed engineering department.

MINIATURIZED STEPPER—This rugged miniaturized stepper was developed for low switching capacity applications for vibration conditions up to 10 G's at 500 cycles. It is constructed with an encapsulated coil for high humidity applications. Unit occupies approximately a three inch cube in volume and can be hermetically sealed. Available for 28 volt D.C. operation with 2 wafers, 12 points; or with SPST or SPDT micro switch. Also, an automatic self-interrupting switch can be incorporated.

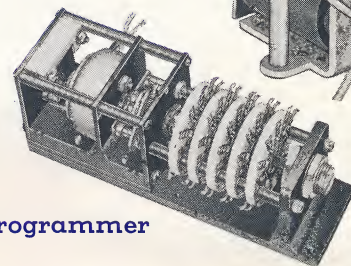
PROGRAMMER—AUTOMATIC STEPPING

MECHANISM—This compact, rugged, long life, highly reliable Programming stepper meets and exceeds MIL-S-25259 (Proposed). Approved and used for control of guided missile and in-flight equipment, it is also recommended for a wide variety of control engineering projects including automated production systems, machine tools and industrial products. Basically, this unit is a rotary solenoid which operates a group of wafer switches. Open or sealed, the Programmer operates under extreme temperatures, high altitude and severe vibration or shock. Available with 8—12—18 or 24 points; up to 12 wafers and unlimited switching arrangements.

CIRCUIT TESTERS—These Circuitizers are designed to check high voltage breakdown, correctness of wiring, of cable and harness assemblies. The units are fully automatic in operation and will check up to 52 separate circuits for high voltage breakdown, continuity, and insulation resistance. Quick disconnect terminal boards are utilized to permit rapid adaptation of the tester to specific customer hookups. Circuitizers designed by Programation allow for standard 19" relay rack mounting, or may be installed in a case for bench top operation. Special Circuitizers may be designed and developed in accordance with special requirements and specifications. Additional models having the same general configuration and function are HC-208 and HC-208S. They are 208 point companion Circuitizers to models HC-52 and HC-52S.



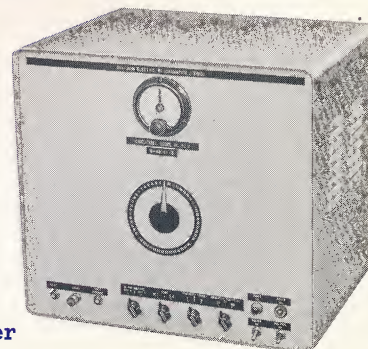
Miniaturized Steppers



Programmer

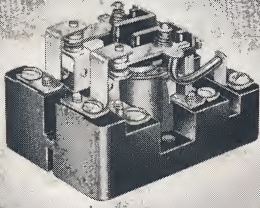


HC-52
Circuitizer

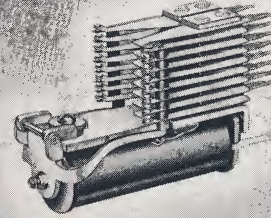


HC-52S
Circuitizer

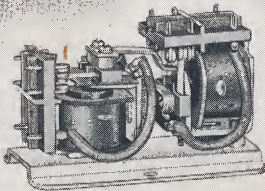
Typical Products in the GUARDIAN COMPLETE LINE



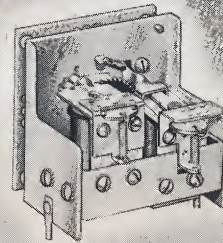
GENERAL
PURPOSE
RELAYS



TELEPHONE
RELAYS

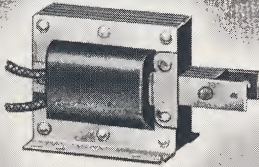


LATCHING
AND
INTERLOCKS

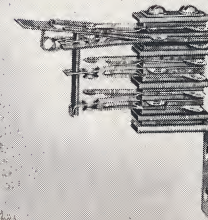


STEPPING
RELAYS

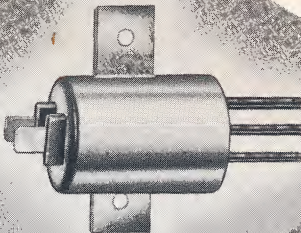
EVERYTHING
UNDER
CONTROL



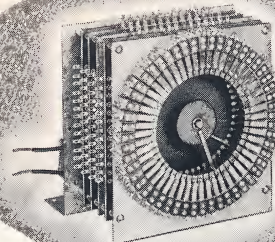
SOLENOIDS



SWITCHES



SPECIAL
CONTROLS



SPECIAL
CONTROLS

*Specific Recommendations Available for Guardian Custom-Engineered
Relays—Steppers—Switches—Solenoids—Complete Control Assemblies*

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